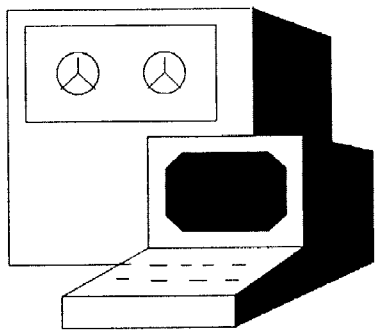
DOD ENTERPRISE MODELING AND CIM CORPORATE LEVEL INTEGRATION



4 OCTOBER 1990

AGENDA

INFORMATION ARCHITECTURE GROUP

ENTERPRISE MODEL

DATA MODELING

DATA STANDARDIZATION

INFORMATION ARCHITECTURE GROUP

- RESPONSIBILITIES
  - Information Architecture
  - Data Administration
  - Data Standards
  - Data Dictionary
- RESOURCES
  - Current Staff - 3
  - NIST and Contractor Assistance
  - Functional Group Data Administrators

ARCHITECTURES

Blueprints or Roadmaps

- ARCHITECTURAL TYPES
  - Technical
  - Systems
    - Information Flow
    - Application
  - Communications
  - Information
    - Data
    - Functions
- FOCUS
  - Current
  - Transition
  - Target

AGENDA

INFORMATION ARCHITECTURE GROUP

ENTERPRISE MODEL

DATA MODELING

DATA STANDARDIZATION

WHY DO WE NEED ARCHITECTURES?

- Establish framework for now and the future
- Integration of business functions and associated information requirements
- Identify gaps, overlaps, and interfaces
- Set functional boundaries for standard systems

PROVIDES STRUCTURE TO MAKE THE WHOLE GREATER THAN ITS PARTS

INFORMATION ARCHITECTURE

Enterprise Level

Model of the Organization's

Information Needs

at the highest level.

Based on.....

Vision
Mission
Goals
Objectives

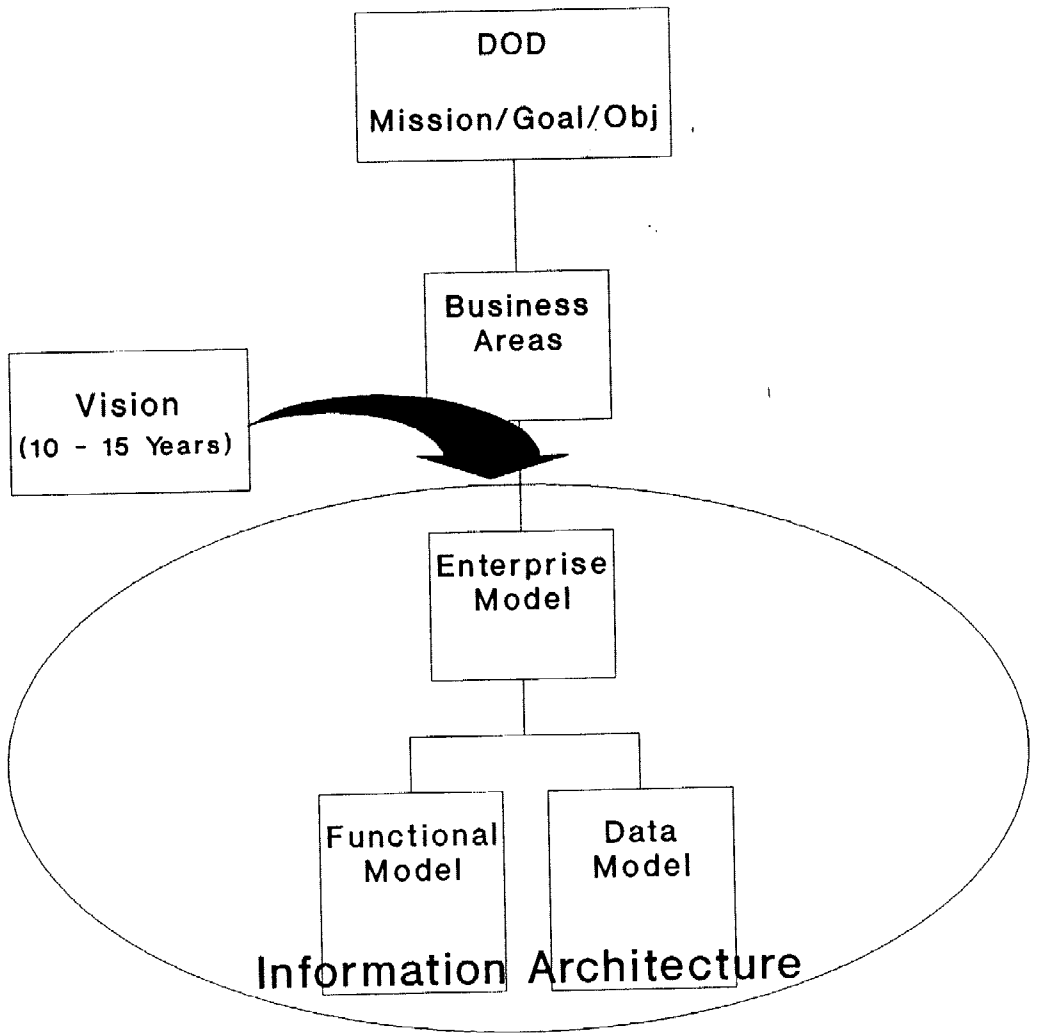
DEVELOPMENT TECHNIQUE

What <u>is</u> our business?	Mission Goals Objectives
What <u>will</u> our business be?	Vision Trends Forecasts
What <u>should</u> our business be?	Strategic Direction Combination of Above

MISSION OF THE DEPARTMENT OF DEFENSE

"The Department of Defense is responsible for providing the military forces needed to deter war and protect the security of the United States."

INFORMATION ARCHITECTURE COMPONENTS



CIM DIRECTION

STRATEGY

- Dual Track
  - Data
  - Process
- One track not dominating the other
- Products are Models

STARTING POINT

- Enterprise Model
- Reconciliation Points

HOW WILL THE ENTERPRISE MODEL BE DEVELOPED?

- Combination of methodologies
- Carefully facilitated group interaction
- Advance preparation of analytical strawmen

METHODOLOGY
Dual Track

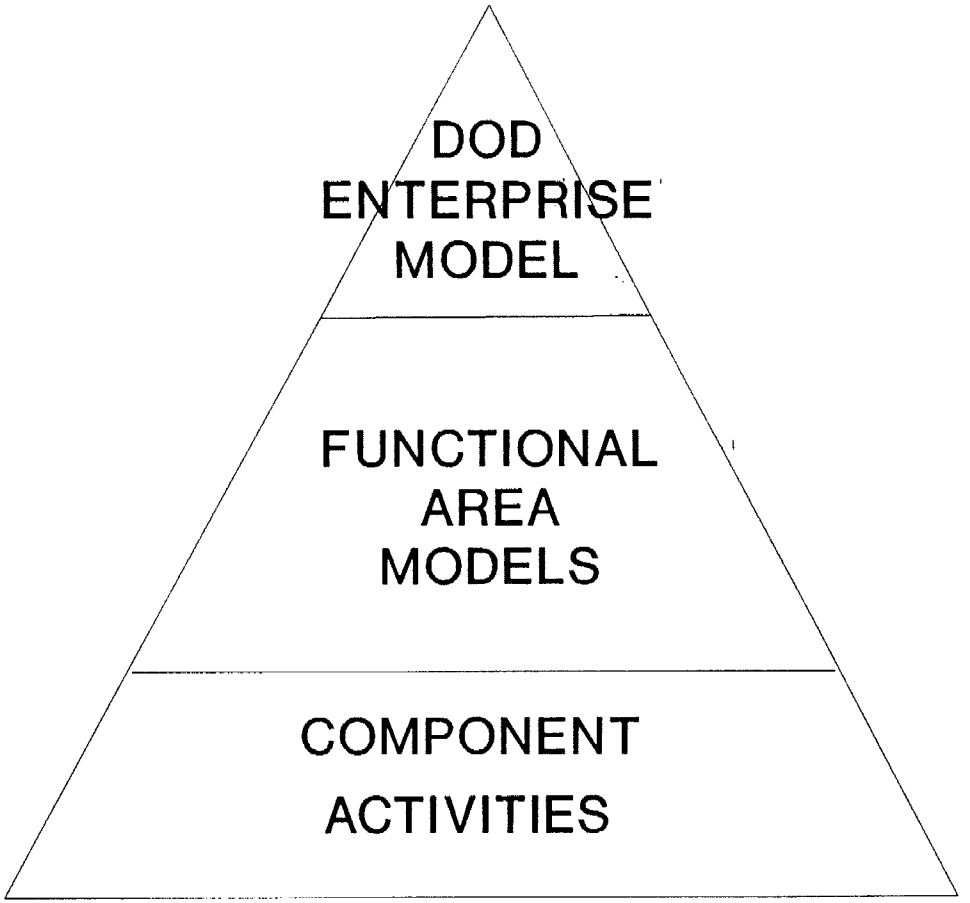
- Function/Process
  - Functional Decomposition
    - Defines *Business Processes*

- Information/Data
  - Information Engineering
    - Identifies Data and Relationships based on *Business Policy*

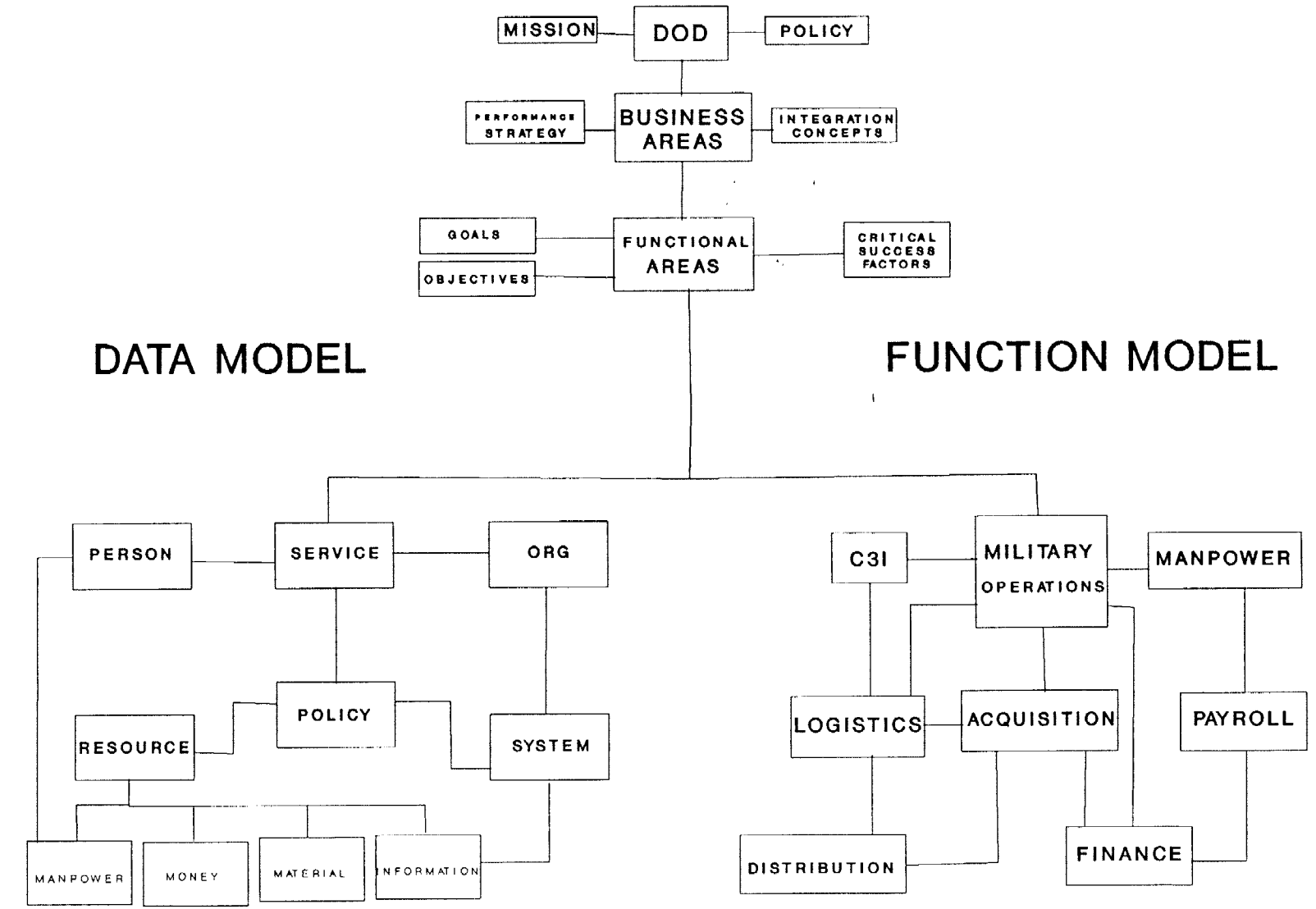
INFORMATION ARCHITECTURE DEVELOPMENT

- Analyze Defense Guidance
- Refine Vision Input from Top Management
- Develop Business Model
  Functional Model
  Data Model
- Use Standardization Rules

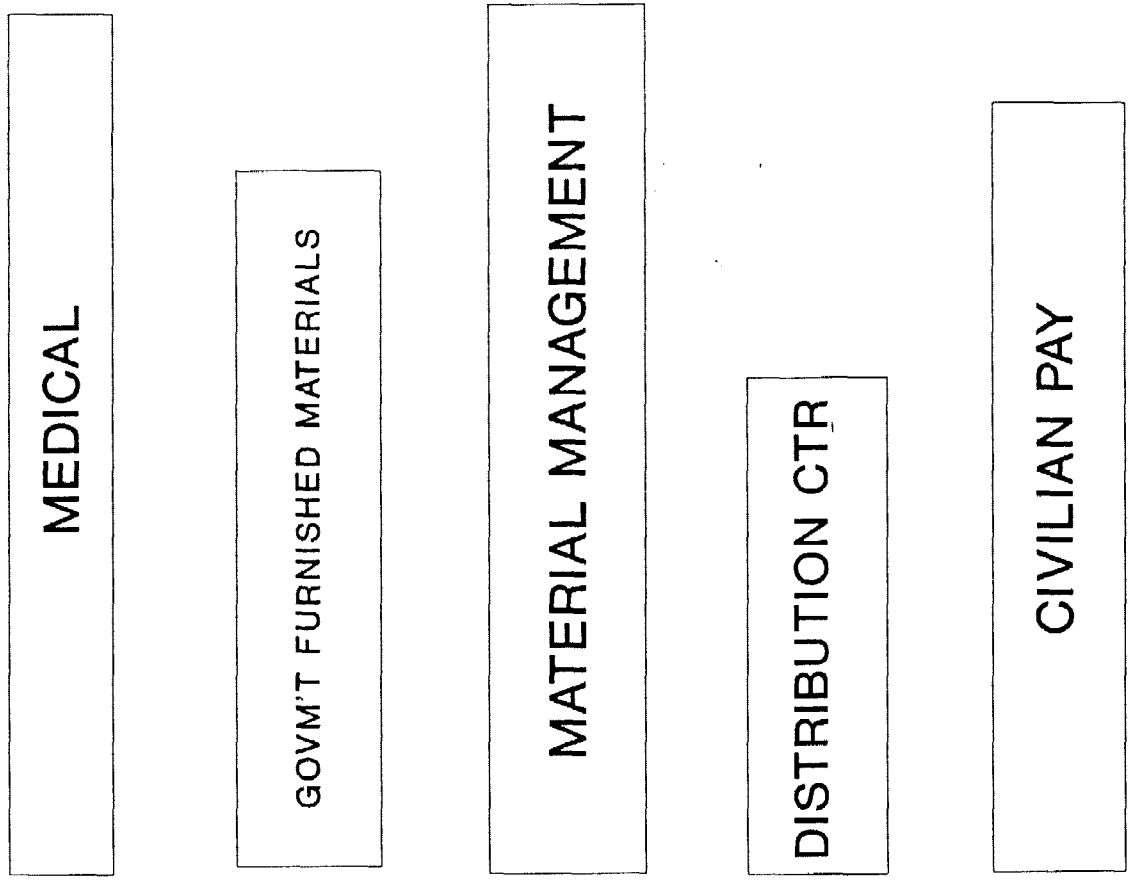
MODEL INTEGRATION



DOD ENTERPRISE MODEL

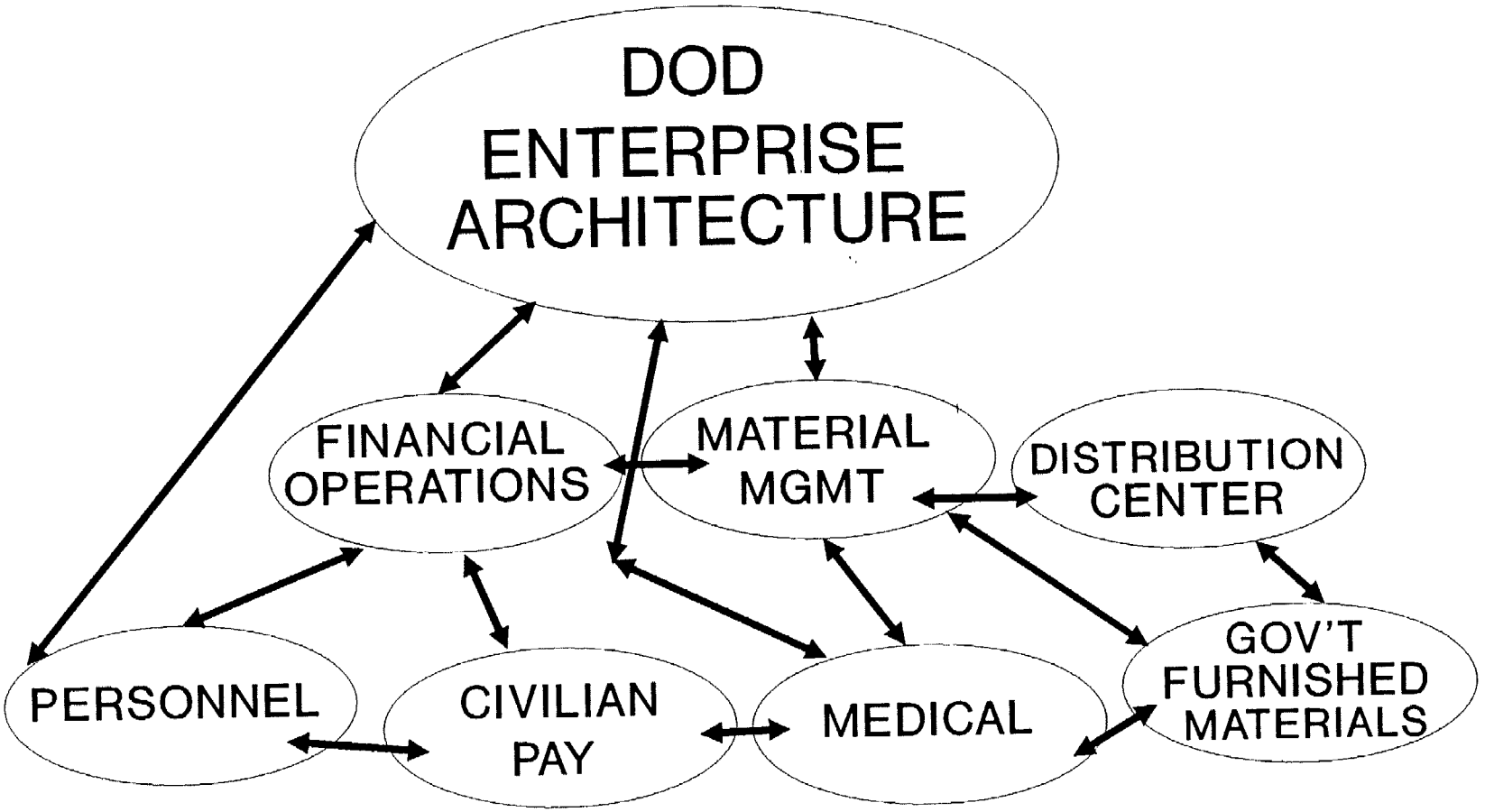


BEFORE THE ENTERPRISE MODEL



"STOVEPIPES"

AFTER THE ENTERPRISE MODEL



"INTEGRATED"

CIM DATA STANDARDIZATION

SCOPE

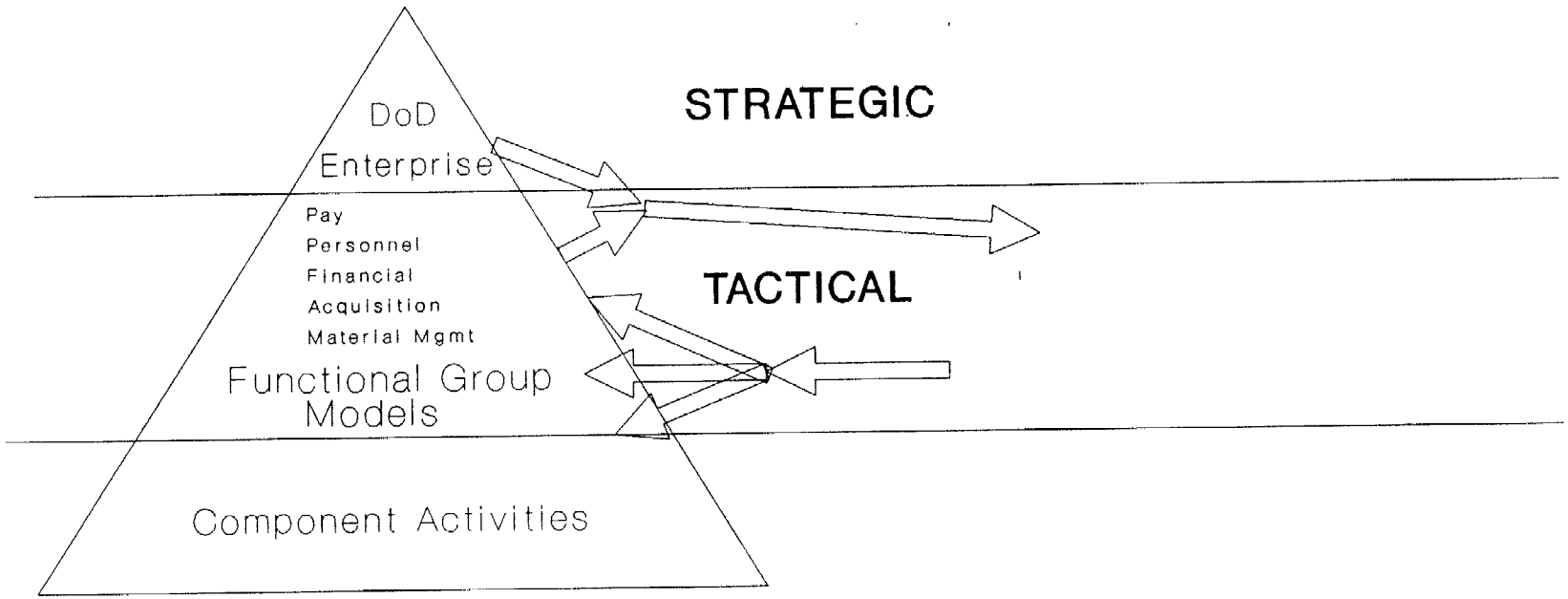
- Data which support DOD information requirements
- Strategic, tactical, and sustaining base information
- Includes data communicated across organizational boundaries (Excludes local use only)
- Addresses both automated and manual processes

CIM DATA STANDARDIZATION

ASSUMPTION

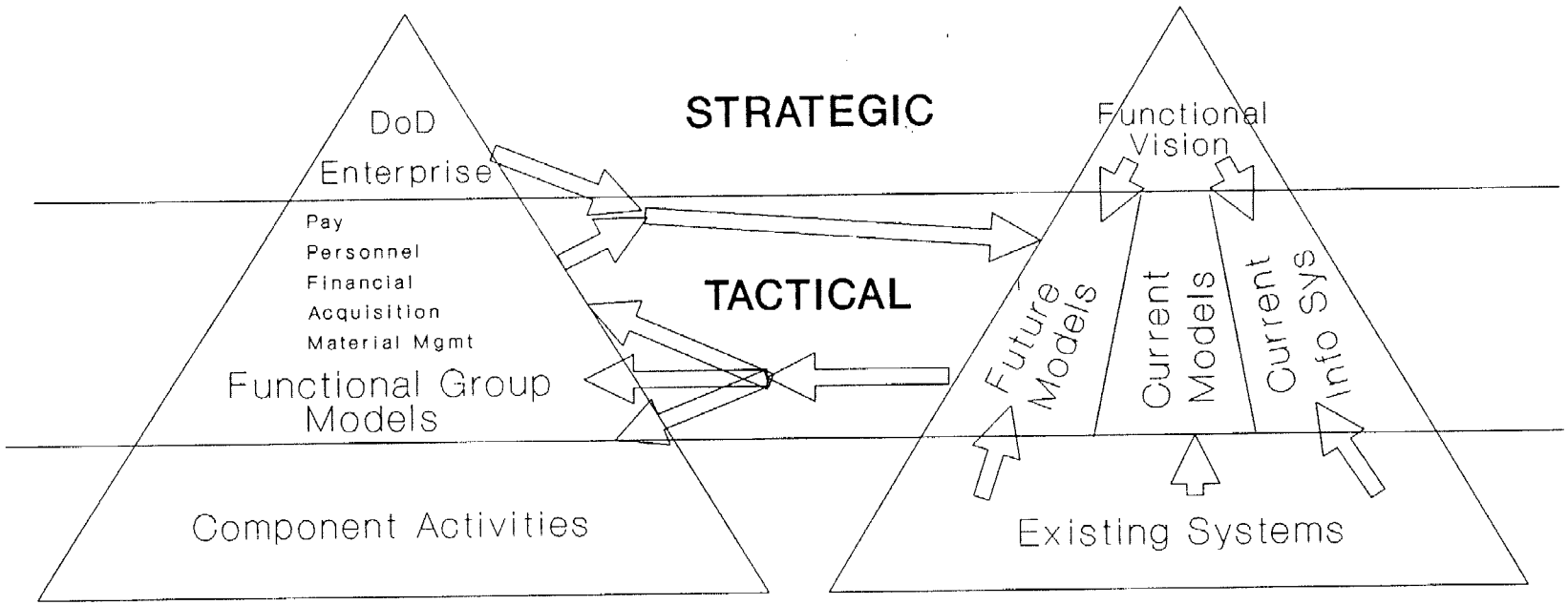
- Data independent of and maintained separately from the applications that use it
- Hardware independent
- Change in Philosophy

MODEL INTEGRATION



DOD VIEW

MODEL INTEGRATION



DOD VIEW

FUNCTIONAL GROUP VIEW

DATA MODEL VS PROCESS MODEL

- Data more stable than processes
  - Emerging technologies
  - Changing methods
  - Changing user requirements
- Integrated data models, like integrated process models, are non-redundant and system independent
  - Result in non-redundant systems
  - Result in non-redundant databases
- Processes can be simplified if data is controlled, streamlined, and simplified
- Application design is easier, faster, and cost-effective

DATA MODEL

Is the abstraction of data structures as metadata:

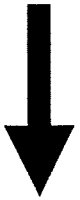
- Data Classes
- Data Types (Entity Types)
- Data Relationships
- Data Descriptions

Represents the data used in, modified by, and resulting from the Business Rules of the enterprise

Integrated Data Model represents the data structures used throughout the entire enterprise

METADATA

- Literally "data about data"
- Abstract representation of data
- Data structure and definition



Data Model is composed of Metadata

ENTERPRISE LEVEL ACTIONS

TASK	STATUS/ACTION	DATE
DoD Mission/Goals/ Objectives Analysis	In Progress	Ongoing
Work Sessions	Start	11-6-90
Data Standarization Policy	Draft submitted for review	Ongoing

AGENDA

INFORMATION ARCHITECTURE GROUP

ENTERPRISE MODEL

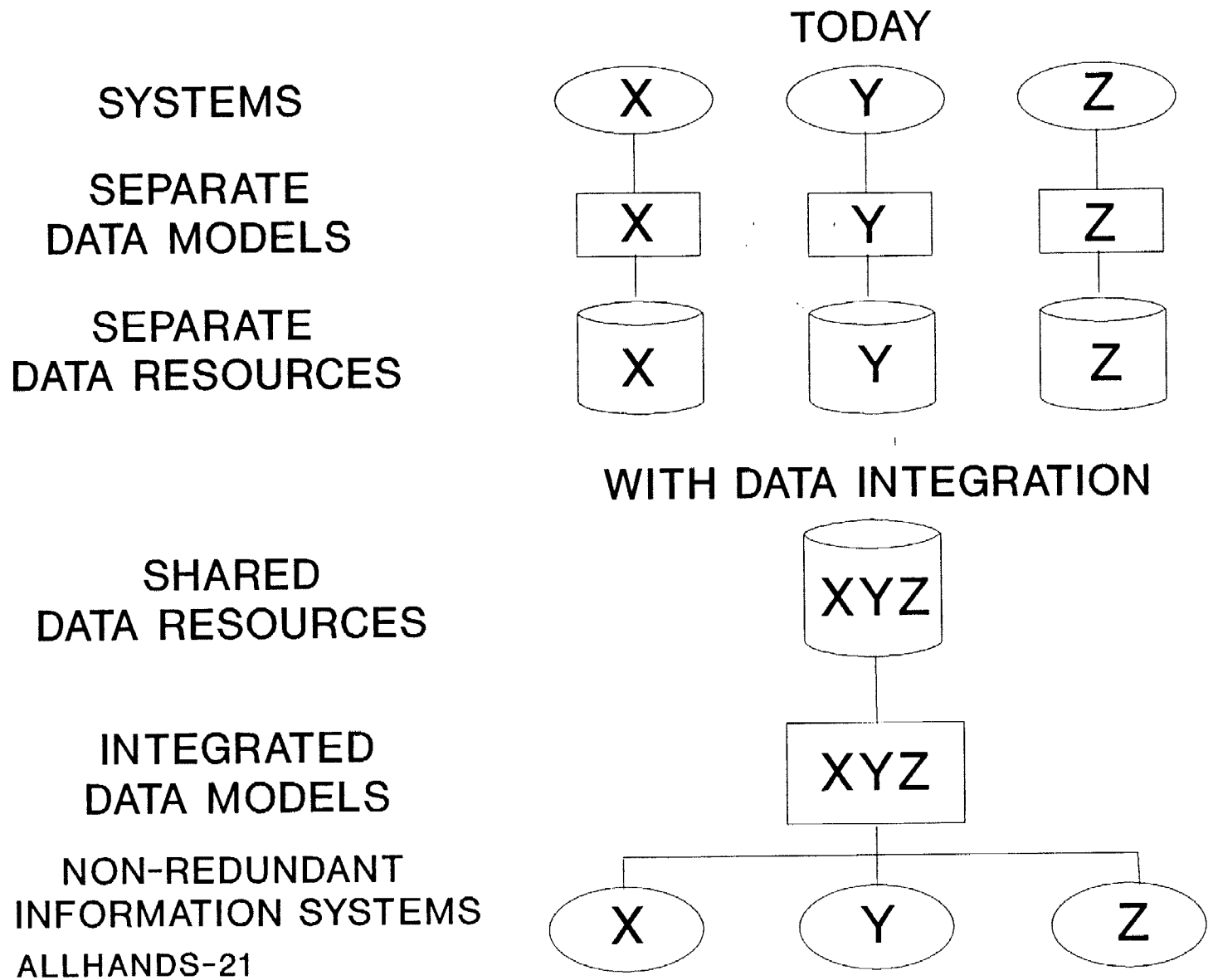
DATA MODELING

DATA STANDARDIZATION

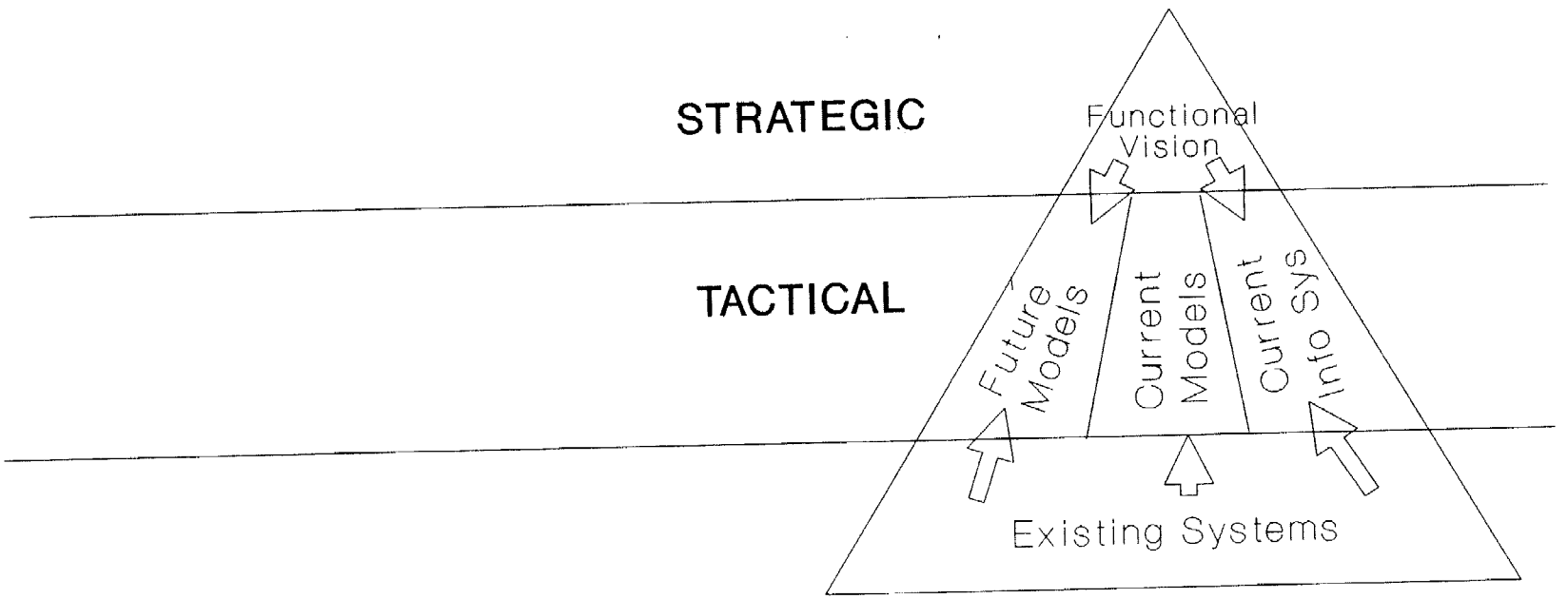
INFORMATION ARCHITECTURE

- Unifying, coherent framework that demonstrates how the parts participate in the whole
- Supports the business of the enterprise
- Composed of:
  - Data Model
  - Process Model
- Result of Data Model and Process Model integration

CIM DATA INTEGRATION



MODEL INTEGRATION



FUNCTIONAL GROUP VIEW

CATEGORIES OF METADATA

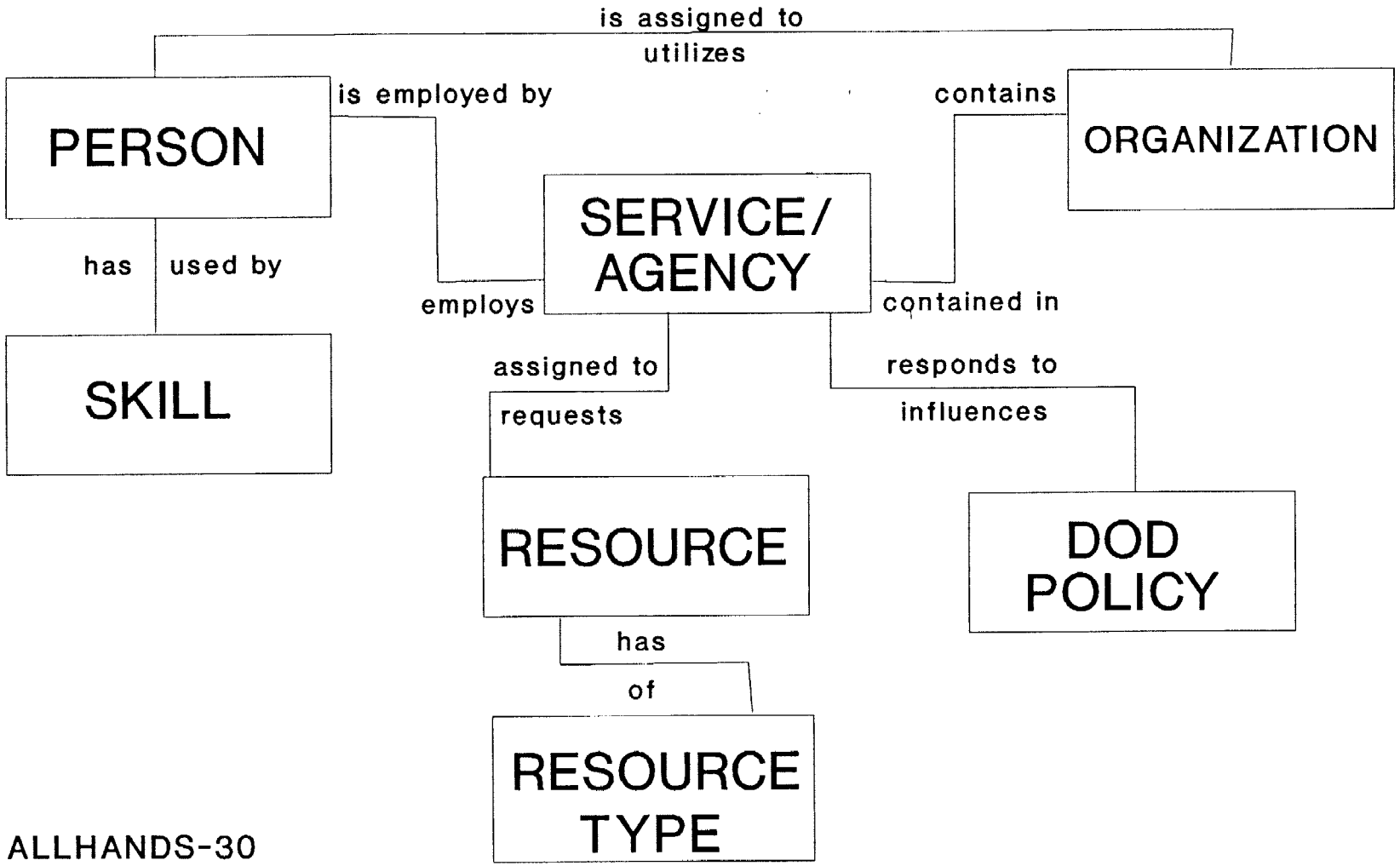
STRATEGIC	Major entities or information classes needed to run the business Example: Personnel Data -- Major Entity: Person
TACTICAL	Entity types and relationships/ additional description of major entities, primary entities, and secondary entities Example: Major Entity: Person Required Information - Employee, Dependent...
OPERATIONAL	Attributes of entities, simplest and most familiar level Example: Major Entity: Person Employee Name Employee Address Job Title Physical Implementation: Data Elements

WHO WILL DESIGN THE DATA MODEL?

Functional experts from the groups will provide input for the data model design, analysis will be performed by:

- Data Administrators of Functional Groups
- Information Architecture Staff
- CASE tool contractors

EXAMPLE ENTITY-RELATIONSHIP DIAGRAM



ALLHANDS-30

DATA NORMALIZATION

- Reducing inventory of data
- Purest form
- Easier access
- Cost beneficial
  - Design
  - Maintenance

BUSINESS NORMALIZATION

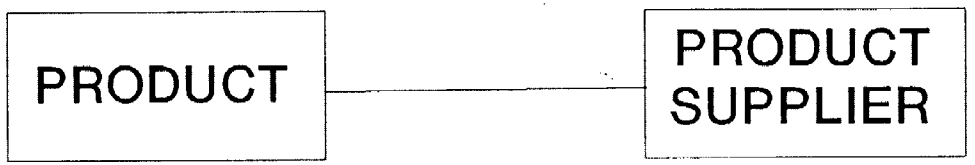
- Data analysis techniques
- Used to simplify the data structure and reduce redundancy in the enterprise's Data Model by identifying data dependencies
- Reflects the Business Rules of the enterprise

KEY POINTS IN NORMALIZATION

- Determines those attributes which uniquely identify each data attribute, called a key or identifier
- Places data attributes into entities where they are fully identified by the whole key of that entity
- First Business Normal Form - Identifies and removes repeating group attributes to new entities
- Second Business Normal Form - Identifies and removes from an entity, attributes which are not wholly dependent on more complex keys

EXAMPLE OF BUSINESS NORMALIZATION

First Business Normal Form



Identifier:
Product Number

Identifiers:
Product Number
Supplier Number

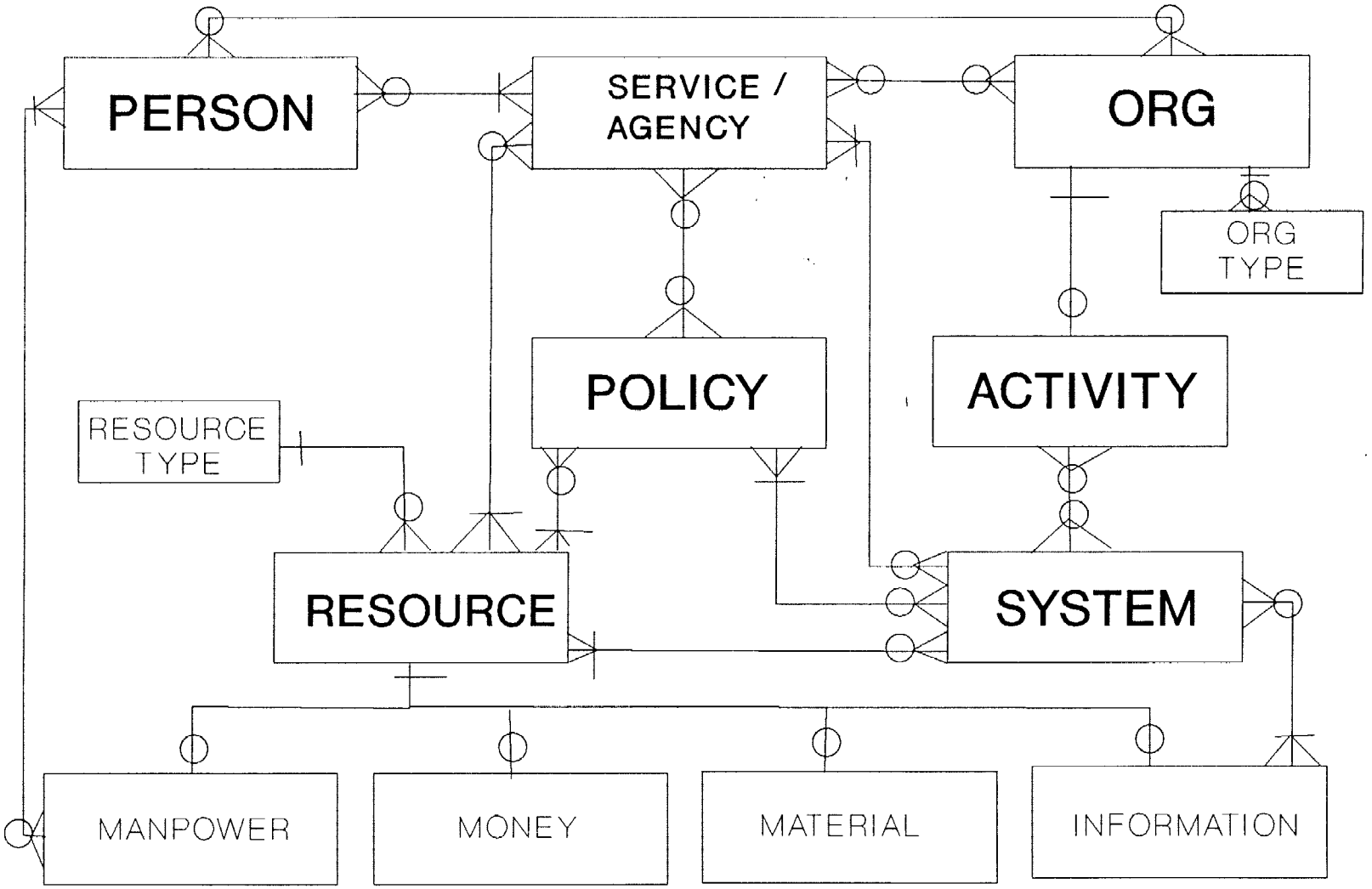
Second Business Normal Form

Identifier:
Product Number

Identifiers:
Product Number
Supplier Number

Identifier:
Supplier Number

EXAMPLE DATA MODEL



ALLHANDS-35

AGENDA

INFORMATION ARCHITECTURE GROUP

ENTERPRISE MODEL

DATA MODELING

DATA STANDARDIZATION

CIM
Data Standardization
Activities

Information Briefing

CIMDSP01

CIM
Data Standardization
Activities

- OBJECTIVES -

- Tackle Integration & Interoperability by managing information down to data element level

- Provide a common framework for organizing data and information DoD-wide

- Recommend policy, standards, guidance, and procedures to support current & future data sharing requirements

CIM
Data Standardization Activities

- SCOPE -

- Standardization of data which support DoD information requirements
- Encompasses strategic, tactical, and sustaining base information
- Includes data communicated across organizational boundaries but does not include system control (JCL etc) or "local use only" data
- Addresses both automated and manual processes

CIM
Data Standardization
Activities

- BASIC ASSUMPTION -

- Data is independent of and maintained separately from the applications which use the data.

CIM
Data Standardization Activities

- ASSUMPTION IMPLICATIONS -

- Significant Management Commitment
- Major Training Requirement
- Long Term Implementation Plan
- Change in the way we do Business

CIM
Data Standardization
Activities

- IMPLEMENTATION STRATEGY -

- Prioritization of CIM Data Element Development
- Plan and Schedule Development Work
- Identification of Needed Generic Elements
- Gain Support of DoD Components

CIM
Data Standardization
Activities

- KEY FEATURES -

- Assumes implementation of Automated Data Dictionary Tool by the DoD Executive Agent

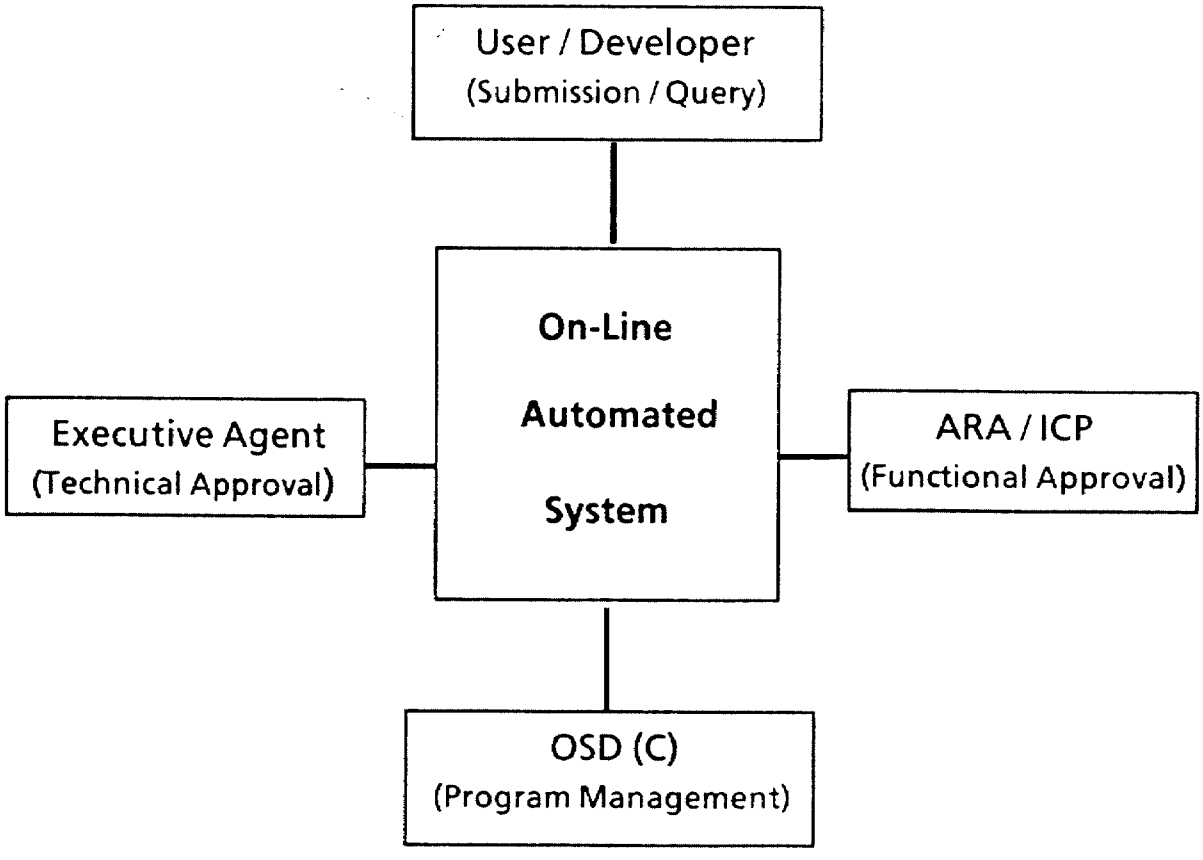
- World-wide use of Automated Data Dictionary Tool

- Use of NIST Naming Conventions

- Major Involvement of Assigned Responsible Agents as Information Class Proponents in the approval chain for Standard Data Elements

CIM
Data Standardization Program

- AUTOMATED DATA DICTIONARY TOOL -



CIMDSP12

CIM
Data Element
Standardization

- QUESTIONS -

- What is happening in data standardization?
- Who is involved?
- What is standardized data?
- How do we standardize data?

CIM
Data Element
Standardization

- ONGOING INITIATIVES -

- Corporate Information Management
- Coordination with NATO, JCS, Army, Air Force, Navy, and other federal agencies
- AR 25-9 Army Data Mgmt and Stds Program
- AFR 4-29 Air Force Data Mgmt and Stds Program
- JCS Pub 6-03.15 Data Administration in the WWMCCS Information System

CIM
Data Element
Standardization

- KEY PLAYERS -

- DoD Comptroller
- Executive Agent
  - Steering Committee
  - Working Group
- ARAs / Information Class Proponents

CIM
Data Element
Standardization

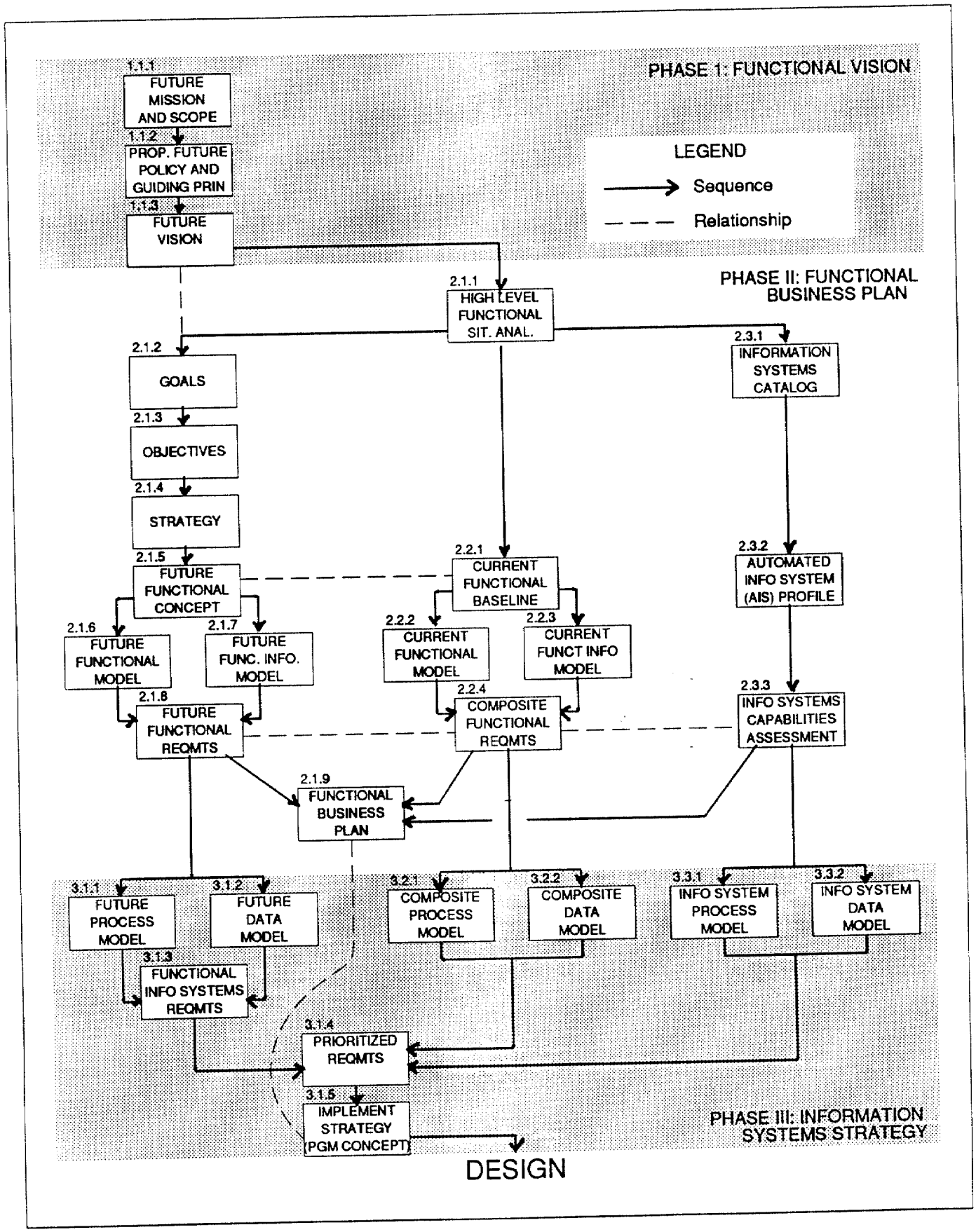
- What is standardized data? -

- Atomic
- Normalized
- Homogeneous
- Well bounded

CIM
Data Element
Standardization

- PROGRAM CONSTRUCTS -

- Naming Conventions: Rules used to name standard elements and their attributes
- Standard Attributes: Data value structures used to describe standard elements
- Generic Elements: Generic data domains based on class words which are the basis for data elements
- Data Elements: Domains of data values based on what the data is and not on how it is used
- Data Element Aliases: Non-standard data elements currently in use in operational systems


PHASE 1: FUNCTIONAL VISION
1.1.1
FUTURE MISSION AND SCOPE
1.1.2
PROP. FUTURE POLICY AND GUIDING PRIN
1.1.3
FUTURE VISION
LEGEND
Sequence
Relationship
PHASE II: FUNCTIONAL BUSINESS PLAN
2.1.1
HIGH LEVEL FUNCTIONAL SIT. ANAL.
2.1.2
GOALS
2.1.3
OBJECTIVES
2.1.4
STRATEGY
2.1.5
FUTURE FUNCTIONAL CONCEPT
2.1.6
FUTURE FUNCTIONAL MODEL
2.1.7
FUTURE FUNC. INFO. MODEL
2.1.8
FUTURE FUNCTIONAL REQMTS
2.1.9
FUNCTIONAL BUSINESS PLAN
2.2.1
CURRENT FUNCTIONAL BASELINE
2.2.2
CURRENT FUNCTIONAL MODEL
2.2.3
CURRENT FUNCT INFO MODEL
2.2.4
COMPOSITE FUNCTIONAL REQMTS
2.3.1
INFORMATION SYSTEMS CATALOG
2.3.2
AUTOMATED INFO SYSTEM (AIS) PROFILE
2.3.3
INFO SYSTEMS CAPABILITIES ASSESSMENT
3.1.1
FUTURE PROCESS MODEL
3.1.2
FUTURE DATA MODEL
3.1.3
FUNCTIONAL INFO SYSTEMS REQMTS
3.1.4
PRIORITIZED REQMTS
3.1.5
IMPLEMENT STRATEGY (PGM CONCEPT)
3.2.1
COMPOSITE PROCESS MODEL
3.2.2
COMPOSITE DATA MODEL
3.3.1
INFO SYSTEM PROCESS MODEL
3.3.2
INFO SYSTEM DATA MODEL
PHASE III: INFORMATION SYSTEMS STRATEGY
DESIGN

CIM
Data Standardization
Activities

- NAMING CONSTRUCTS -

- Adjective(s) + Noun
- Verb Phrase
- Verb + Adjective(s) + Noun
- Modifier(s) + Prime Word + Modifier(s) + Class Word + Qualifier(s)

CIM
Data Standardization Activities

- NAMING STRUCTURE -

- Verb + Adjective(s) + Noun -

- Enterprise Processes
  Examples:
    Control Funds
    Acquire Materiel

- Implementing Actions
  Examples:
    Research Current Video Technology
    Retrain Employees

- Enterprise Objectives
  Examples:
    Budget OMA Funds
    Disburse Disability Payments

CIM
Data Standardization Activities

- NAMING STRUCTURE -

- Adjective(s) + Noun -

- Key Success Factors
- Information Classes
- Data Entities
- Deficiencies and Constraints
- Objects
- Events
- Prioritization Criteria
- Evaluation Criteria

CIM
Data Standardization Activities

- NAMING STRUCTURE -

- Adjective(s) + Noun -

- Key Success Factors
  Examples:
    Adequate Funding
    Qualified Personnel
    Trained Technicians
    Government Furnished Materiel

- Objects
  Examples:
    Employee
    Stockage Item
    Wheeled Vehicle
    Aircraft

CIM
Data Standardization Activities

- NAMING STRUCTURE -

- Verb Phrase -

- Relationships

Examples: Belongs to
Provides funding for
Owns
Generates values of
Is a member of

CIM
Data Standardization Activities

- NAMING STRUCTURE -

- Modifier(s) + Prime Word + Modifier(s) + Class Word + Qualifier(s) -

- Standard Data Elements

Examples:

Information Element Definition Text
Information Class Identifier
Information Element Maximum Data Value Length Characters
Information Element Class Word Name
Individual Birth Date

CIM
Data Element
Standardization

- DATA ELEMENT NAME SYNTAX -

- NIST.....M : PW : M : CW
- JCS.....M : PW : M : CW : Q
- Army.....M : PW : M : CW : Q
- Air Force.....M : PW : M : CW : Q
- Marine Corps....M : PW : M : CW : Q

- CIM.....M : PW : M : CW : Q

CIM
Data Element
Standardization

- DATA ELEMENT NAMING CONVENTION RULES -

- Rule 1: Each generic element name will contain one and only one class word. The sequence of words in a generic element name will be: (modifier), class word, and (up to two qualifiers); where () denotes optional.

- Rule 2: Class words will be reserved. They will not be used as modifiers, qualifiers, or prime words.

- Rule 3: Each data element name will contain one designated prime word from a reserved list and describe only one concept.

- Rule 4: The data element name word sequence will be: (modifiers), prime word,(modifiers), class word, and (qualifiers); where () denotes optional.

CIM
Data Element
Standardization

- DATA ELEMENT NAMING CONVENTION RULES -

- Rule 5: Each data element name will include its related generic element name.

- Rule 6: Plurals of class words and prime words are not allowed.

- Rule 7: Modifiers and qualifiers will be used to fully describe a standard data element. Up to five modifiers of the prime word and one modifier plus up to two qualifiers of the class word are allowed.

- Rule 8: Word order of commonly used terms will be preserved in data element and data element alias names (e.g., Port-of-debarkation, Department-of-Defense, etc.).

CIM
Data Element
Standardization

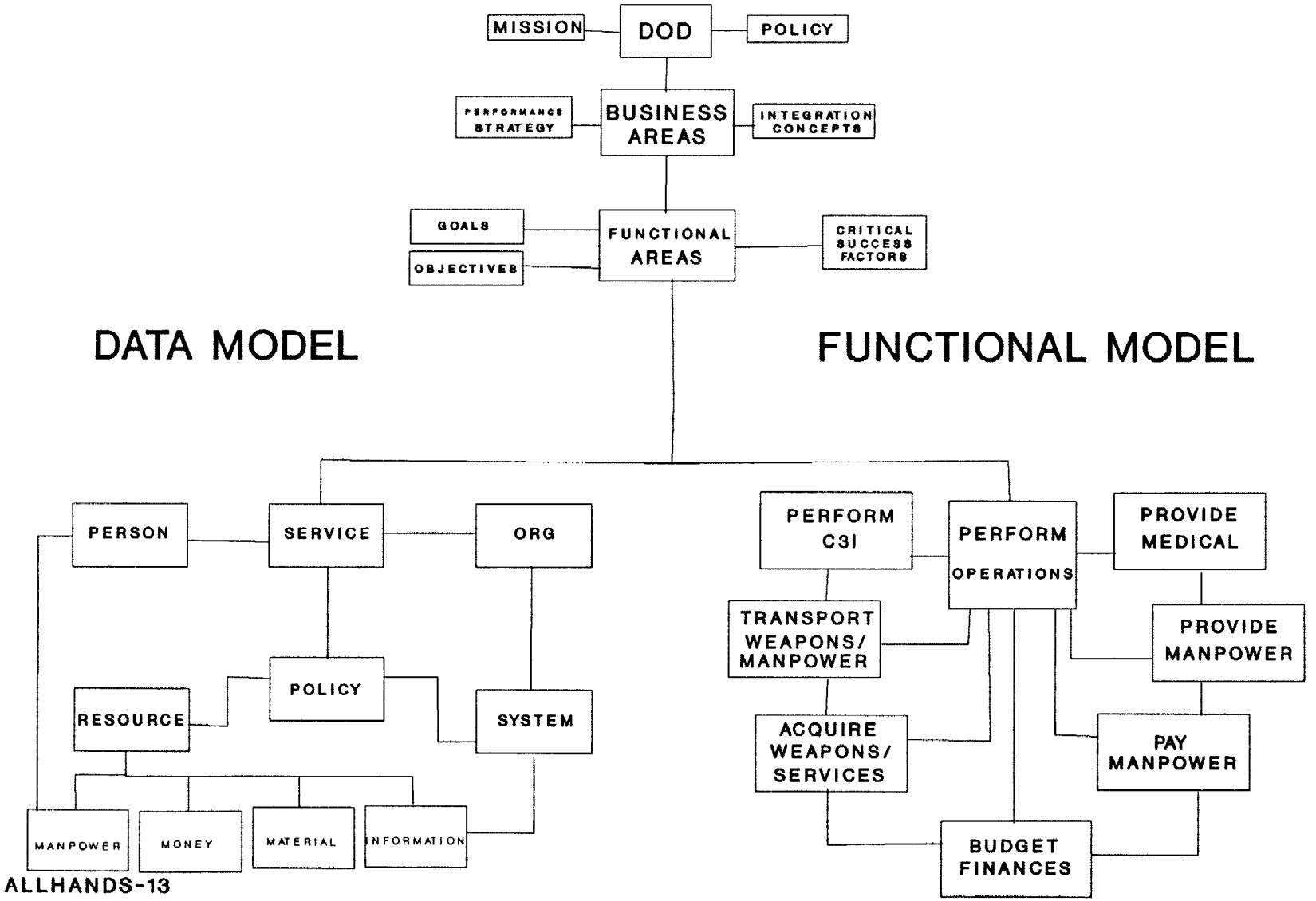
- DATA ELEMENT NAMING CONVENTION RULES -

- Rule 9: A unit-of-measure qualifier will be applied to all data elements that describe a numeric quantity (e.g., weight short-tons, length yards, etc.).
- Rule 10: Abbreviations and acronyms are not permitted in standard element names.
- Rule 11: Only alphabetic characters (A-Z), numbers (0-9), hyphens (-), and underscores (_) are permitted in standard element names.
- Rule 12: Names of organizations, computer or information systems, forms, directives, screens, and reports are not permitted in standard element names.
- Rule 13: Titles of blocks, rows, and columns of screens, reports, and listings are not permitted in element names unless the titles satisfy rules 1 thru 11.

ADDITIONAL SLIDES

ENTERPRISE MODEL/INTEGRATION BRIEF

EXAMPLE DOD ENTERPRISE MODEL



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Work Sessions	Start	11-6-90
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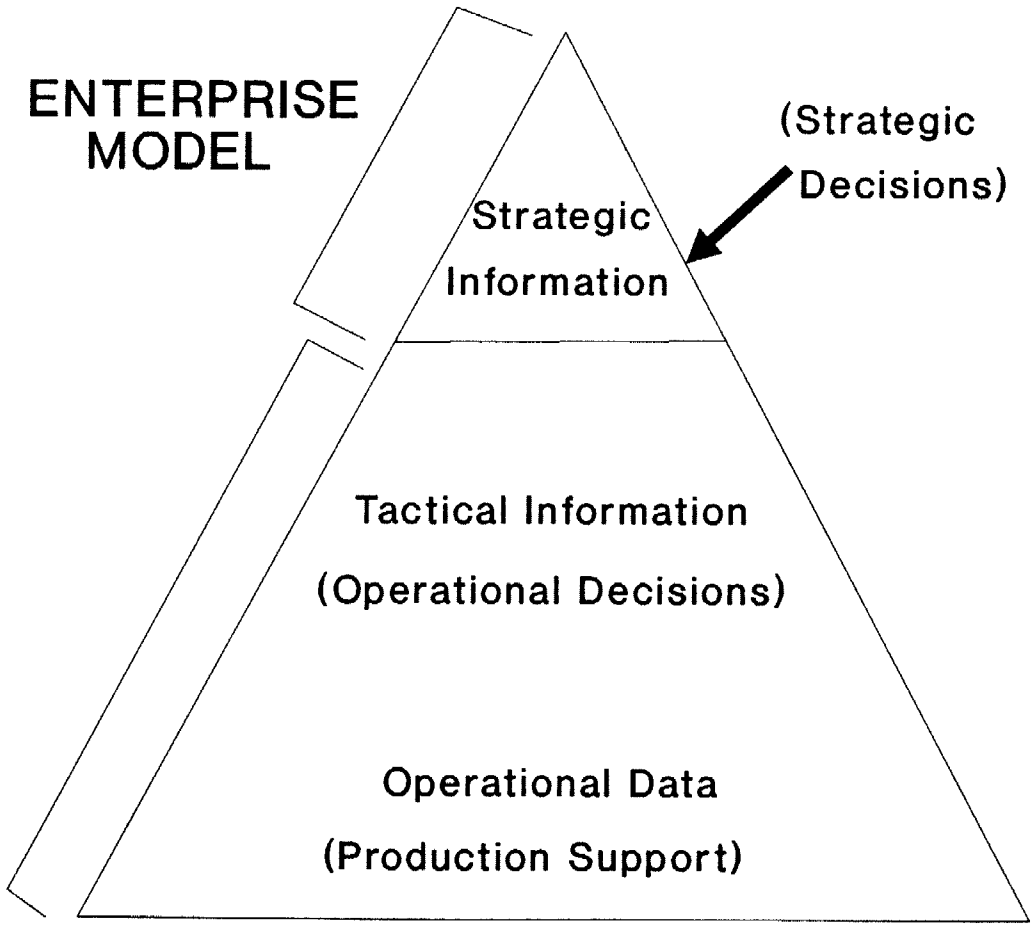
LEVELS OF INFORMATION
(Information Uses)



ALLHANDS-27A

FUNCTIONAL TEAM DATA ADMINISTRATION REPRESENTATIVE

Roles

- Implementor of Data Administration (DA) standards and policies for the Functional Group in accordance with DoD Directive 5000.11.
- Key person for data modelling and data requirements.
- Liaison with other functional group DA representatives.

Responsibilities

- Work with the OSD/CIM Data Administrator Group, perform as data expert in functional group tasks.
- Monitor application of data naming, data definition, data dictionary requirements in accordance with CIM data standardization procedures.
- Analyze and review all functional group products for data impact and application.
- Coordinate analysis of current data models and development of future data model and linkage to other functional group data models.
- Assist in reconciliation of function and data models for Functional Group.
- Provide liaison for creation of function/data matrix at enterprise level (OSD).
- Coordinate actions for development of standard transactions between functions.
- Provide liaison for functional group for refinement of corporate data architecture and linkage to functional group data model.